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EXAMINER	
CHANG, EDITH M	
ART UNIT	**PAPER NUMBER**
2637	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/737,196	Applicant(s) ODE ET AL.	
	Examiner Edith M Chang	Art Unit 2637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 12 August 2004.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-42 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,2,14-20 and 25-31,38-42 is/are rejected.

7)☒ Claim(s) 3-13,21-24 and 32-37 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments/Remarks

1. Applicant's arguments, see pages 36-39, filed August 12, 2004, with respect to claims 3-13, 21-24 and 32 have been fully considered and are persuasive. The rejection of claims 3-13, 21-24 and 32-37 has been withdrawn.

Applicant's arguments filed August 12, 2004 have been fully considered but they are not persuasive. Claims 1-2, 14-20, 25-31 and 38-40 are upheld.

Claims 1 & 18, Applicants argue that 1) a distortion compensation coefficient correction unit for correcting the distortion compensation coefficient, which has been calculated by the distortion compensation coefficient calculation unit, in such a manner that the transmit signal that has been subjected to the distortion compensation processing will not exceed a dynamic range of the DA converter, and

2) a distortion compensation coefficient updating unit for updating a distortion compensation coefficient, which has been stored in the memory, by the distortion compensation coefficient that has been corrected.

Response with respect to item 1), Matsuoka et al. teaches the amplitude after compensation to the DA converter (in the modulator) to the power amplifier being under the distortion control as taught in the convention art stated in the page 1 lines 10 to 15 of the specification, and as the disclosures of the drawings of the instant application. Further Mandyam teaches/explicitly specifies the distortion compensation (the gain control block 68 & VGA 42 of

FIG.6) control the amplitude not exceeding a dynamic range of the DA converter before input the amplitude to the power amplifier (column 7 lines 1-10). Hence both references are regarding the compensating/correting the distortion of the power amplifier.

As Matsuoka et al. using the DA before inputting the signal to the power amplifier, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to implement the unit performing the limited dynamic range of the DA on the transmit signal taught by Mandyam in the Matsuoka et al.'s correcting portion for correcting the distortion compensation coefficient in such a manner that the transmit signal that has subjected to the distortion compensation processing will not exceed a dynamic range of the DA converter for the purpose of limiting the amplitude to the power amplifier to reduce the non-linear distortion to meet the quality of service level constrain of CDMA (column 5 lines 27-35). Therefore, the combination/modification is proper.

Response with respect to item 2), Matsuoka et al. discloses a distortion compensation coefficient updating unit for updating a distortion compensation coefficient, which has been stored in the memory, by the distortion compensation coefficient that has been corrected, such as in FIG.8 the updating unit 420 updates compensation coefficients stored in the memory 404 with the newly corrected/calculated compensation coefficient as stated in column 35 lines 34-55. Accordingly, in the memory 404, a pair of the compensation coefficients is renewed or updated in response to the output of the updating unit 420, hence Matsuoka et al. teaches the item 2).

Claims 14, 16, 25 and 28, Applicants argue that the references does not have 1) a table for storing, in advance in association with combination of the amplitude squared and the

compensation coefficients, the corrected compensation coefficients replace the one in the table when the amplitude squared/power does not exceed to cause the distortion and 2) a updating unit updates the corrected/calculated compensation coefficients in the table in the memory.

Matsuoka et al. teaches the table in the memory storing the signal/power associating its compensation coefficients in column 33 lines 38-60 wherein states clearly in FIG.8 the first section of the memory 404 is designed so that a desired relation between the calculated amplitude (or the calculated power) and the I compensation coefficient will be provided therein as a reference table (column 33 lines 45-48) and the second section of the memory 404 is designed so that a desired relation between the calculated amplitude (or the calculated power) and the Q compensation coefficient will be provided therein as a reference table (column 33 lines 55-59). The distortion compensation system of the power amplifier is to control the signal amplitude/power under a limit to reduce/compensate the distortion, Matsuoka et al. teaches the updating unit to update the table with the corrected values as the signal under the control/limit to correct/compensate the distortion.

Further Barbe teaches/explicitly specify the power limitation to compensate the distortion of the power amplifier by updating compensation index/coefficient stored in the memory. The items 1 and 2 are taught by the references and are not unique of the application.

Claims 31, Applicants argue that Matsuoka fails to teach an amplitude controller for controlling amplitude of the feedback signal based upon amplitude or power of the transmit signal before the distortion compensation thereof.

Matsuoka teaches the amplitude of the feedback signal is controlled by the correction unit (418 FIG.8) based upon amplitude of the transmit signal in column 35 lines 12-16 wherein the recovered baseband signal is the feedback signal from the power amplifier, the correction unit is the amplitude controller performs controlling amplitude of the recovered baseband signals by multiplying them with the compensation coefficients of the transmit signal amplitude. Hence Matsuoka teaches and suggests the amplitude controller. Further Barbe teaches/explicitly specify the amplitude controller controlling the amplitude of the feedback signal before the compensation in FIG.10 wherein the element 242 controlling the amplitude of the feedback signal.

Claim Objections

2. Claims 3-13, 21-24 and 32-37 are objected to because of the following informalities:

Claim 3, line 6: "to distortion compensation" is suggested changing to "the distortion compensation"; line 7: "to distortion" is suggested changing to "to the distortion"; line 9 : "upon a transmit" is suggested changing to "upon the transmit"; line 12: "a distortion" is suggested changing to "the distortion"; line 15: "a transmit signal" is suggested changing to "the transmit signal"; line 16: "by distortion" is suggested changing to "by the distortion"; and line 23: "updates a" is suggested changing to "updates the".

Claim 4 & Claim 9, line 6: 'as a" is suggested changing to "as the".

Claim 5, line 2: "a distortion" is suggested changing to 'the distortion".

Claim 7 & Claim 13, line 2: “a distortion” is suggested changing to “the distortion”; and line 3: “subtracting” is suggested changing to “subtracting the calculated distortion compensation coefficient”.

Claim 8, line 4: “to distortion compensation processing” is suggested changing to “to a distortion compensation processing”; line 7: “a transmission” is suggested changing to “the transmission”; line 9: “a transmit signal” is suggested changing to “the transmit signal”; line 10: “compensation” is suggested changing to “compensation processing”; line 11: “updating a distortion” is suggested changing to “updating the distortion”; line 16: “a transmit” is suggested changing to “the transmit”; line 22: “a distortion” is suggested changing to “the distortion”; and line 31: “compensation, said” is suggested changing to “compensation coefficient, said”.

Claim 9, Claim 10, Claim 11, Claim 12 & Claim 13, line 1: “The apparatus” is suggested changing to “The distortion compensating apparatus”.

Claim 10, line 4: “a maximum” is suggested changing to “the maximum”.

Claim 11, line 2: “a transmit” is suggested changing to “the transmit”, “by” is suggested changing to “by the”; and line 6: “to h_{n+1} (p)/m” is suggested changing to “to the distortion compensation coefficient h_{n+1} (p)/m”.

Claim 12, line 6: “computed by” is suggested changing to “computed by the distortion compensation coefficient”.

Claim 21, lines 7 & 8: “a transmit” is suggested changing to “the transmit”; line 12: “calculating a distortion” is suggested changing to “calculating the distortion”; line 13: “a transmit signal” is suggested changing to “the transmit signal”; line 15: “updating a distortion” is suggested changing to “updating the distortion”; line 17: “a transmit signal” is suggested

changing to “the transmit signal”, “said apparatus” is suggested changing to “said distortion compensation apparatus”; and line 24 & lines 27-29: “$| h_{n+1} (p) |^2$” is suggested changing to “the square $| h_{n+1} (p) |^2$ of the distortion compensation coefficient $h_{n+1} (p)$”, “$| h (p)_{MAX} |^2$” is suggested changing to “the square $| h (p)_{MAX} |^2$ of the set maximum distortion compensation coefficient”.

Claim 22, Claim 23 & Claim 24, line 1: “The apparatus” is suggested changing to “The distortion compensating apparatus”.

Claim 22, line 2: “$| h_{n+1} (p) |^2$” is suggested changing to “the square $| h_{n+1} (p) |^2$ of the distortion compensation coefficient $h_{n+1} (p)$ ”, “$| h (p)_{MAX} |^2$” is suggested changing to “the square $| h (p)_{MAX} |^2$ of the set maximum distortion compensation coefficient”; line 3: “$| h_{n+1} (p)'$ ” is suggested changing to “$| h_{n+1} (p)' |$”; and line 4: “to $h_{n+1} (p)/m$” is suggested changing to “ to the distortion compensation coefficient $h_{n+1} (p)/m$”.

Claim 23, line 6: “a transmit” is suggested changing to “the transmit”; line 10: “each baseband” is suggested changing to “each analog transmit baseband”.

Claim 24, line 7: “a transmit” is suggested changing to “the transmit”.

Claim 32, line 6: “a transmit” is suggested changing to “the transmit”, “to distortion” is suggested changing to “to a distortion”; line 9: “a distortion” is suggested changing to ‘the distortion”; line 10: “a transmit” is suggested changing to “the transmit”; line 11: “compensation” is suggested changing to “compensation processing”; line 12: “a distortion” is suggested changing to “the distortion”.

Claims 33-37, line 1: “The apparatus” is suggested changing to “The distortion compensating apparatus”.

Claim 33, line 3: “thereof” is suggested changing to “processing thereof”.

Claim 34, line 2: "to distortion" is suggested changing to "the distortion"; line 4: "compensation" is suggested changing to "compensation processing"; line 7: "the instruction" is suggested changing to "the instructing".

Claim 35, line 3: "compensation" is suggested changing to "compensation processing"; line 9 & line 11: "instruction" is suggested changing to "instructing".

Claim 36, line 2: "to distortion" is suggested changing to "to the distortion"; line 4: "compensation" is suggested changing to "compensation processing"; line 8: "instruction" is suggested changing to "instructing".

Claim 37, line 2: "to distortion" is suggested changing to "to the distortion"; line 4: "a" is suggested changing to "the"; line 5: "by a" is suggested changing to "processing by a"; and line 6: "to distortion" is suggested changing to "to the distortion".

Claim 6 is indirectly dependent on the objected claim 3.

Appropriate corrections are required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 18, 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuoka et al. (US 6400774 B1) in view of Mandyam (US 6167273).

Regarding **claims 1, 41 & 42**, except explicitly specify the distortion compensation coefficient correction unit that the transmit signal will not exceed a dynamic range of the DA converter, Matsuoka et al. discloses all subject matter: a distortion compensating apparatus for compensating for distortion of a transmission power amplifier (Abstract, FIG.8), comprising: a memory for storing distortion compensation coefficients (404/416 FIG.8); a predistortion unit for subjecting a transmit signal to distortion compensation processing (110 FIG.8 is the predistortion unit); a DA converter (111 FIG.8) for converting a digital transmit signal, which has been subjected to distortion compensation processing, to an analog signal input to the transmission power amplifier (117 FIG.8 is the transmission power amplifier); a distortion compensation coefficient calculation unit (420&418 FIG.8) for calculating a distortion compensation coefficient (column 35 lines 1-27 where the 420 does the calculation/computation; column 35 lines 36-45 where the 418 does the calculation as well) based upon a transmit signal before the distortion compensation (BASBAND I/Q SIGNAL 102 FIG.8 is the transmit signal) and a feedback signal fed back from an output side of the transmission power amplifier (219 FIG.8 the feedback signal from an output side of 117/power amplifier FIG.8); a distortion compensation coefficient updating unit for updating a coefficient stored in the memory by the corrected one (420 FIG.8, column 35 lines 44-46, wherein the 420 updates the memory 404 with the corrected/new coefficient). However Mandyam teaches the limited dynamic range of the DA for compensating the amplitude distortion of the power amplifier (46, 68 FIG.6, column 6 line 50-column 7 line 17, where the function implemented in 68 FIG.6). As Matsuoka et al. using the DA before feeding in the signal to the power amplifier, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to implement the unit performing the

limited dynamic range of the DA on the transmit signal taught by Mandyam in the Matsuoka et al.'s correcting portion for correcting the distortion compensation coefficient in such a manner that the transmit signal that has subjected to the distortion compensation processing will not exceed a dynamic range of the DA converter, to meet the quality of service level constrain of CDMA (column 5 lines 27-35).

Regarding **claim 18**, except explicitly specify the distortion compensation coefficient correction unit that the transmit signal will not exceed a dynamic range of the DA converter, Matsuoka et al. discloses a distortion compensating apparatus for compensating for distortion of a transmission power amplifier (Abstract, FIG.8), comprising: a memory for storing distortion compensation coefficients (404/418 FIG.8); an error signal generator (418-420 FIG.8, column 35 lines 34-55, where the error signal is the difference between the baseband component of the transmit signal that is before compensation, and the recovered signal that is subjecting the compensation); a DA and a combiner (112 FIG.8) for converting the error signal to analog signal and adding to an analog transmit signal; a distortion compensation coefficient calculation unit (420&418 FIG.8) for calculating a distortion compensation coefficient (column 35 lines 1-27 where the 420 does the calculation/computation; column 35 lines 36-45 where the 418 does the calculation as well) based upon a transmit signal before the distortion compensation (BASBAND I/Q SIGNAL 102 FIG.8); a distortion compensation coefficient updating unit for updating a coefficient stored in the memory by the corrected one (420 FIG.8, column 35 lines 44-46, wherein the 420 updates the memory 404 with the corrected/new coefficient). However Mandyam teaches the limited dynamic range of the DA for power amplifier (46, 68 FIG.6, column 6 line 50-column 7 line 17, where the function implemented in 68 FIG.6). As Matsuoka

et al. using the DA before feeding in the signal to the power amplifier, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to implement the unit performing the limited dynamic range of the DA on the transmit signal taught by Mandyam in the Matsuoka et al.'s correcting portion for correcting the distortion compensation coefficient in such a manner that the transmit signal that has subjected to the distortion compensation processing will not exceed a dynamic range of the DA converter, to meet the quality of service level constrain of CDMA (column 5 lines 27-35).

5. Claims 14, 16, 25, 28, 31, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuoka et al. (US 6400774 B1) in view of Barber (US 6230031 B1).

Regarding **claims 14 & 16**, except explicitly specify the upper-limit power, Matsuoka et al. discloses a distortion compensating apparatus comprising: a memory for storing compensation coefficients (404/416 FIG.8); a predistortion unit using a compensation coefficient (110 FIG.8); a DA converter for converting a digital transmit signal input to the power amplifier (111 FIG.8); a coefficient calculation unit for calculating a coefficient based upon a transmit signal before the compensation (420/418 FIG.8); a table for storing in advance in association with combinations of square of the input signal and compensation coefficient, corrected coefficients (column 33 lines 38-50, where the compensation coefficients and calculated amplitude/the calculated power will be provided as a reference table in advance). However Barber teaches a comparator for comparing power of a transmit signal and an upper-limit power (FIG.7, column 7 lines 45-65). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to implement the comparator for comparing power taught by

Barber in Matsuoka et al.'s correcting portions (comparing to the upper-limit power) to have the power amplifying circuitry support the wireless telephone systems such as CDMA, TDMA (column 1 lines 15-23, lines 47-55) and compensate the signal losses (column 1 lines 55-column 2 line 20).

Regarding **claims 25 & 28**, except explicitly specify the upper-limit power, Matsuoka et al. discloses a distortion compensating apparatus comprising: a memory for storing compensation coefficients; an error signal generator (420 FIG.8, column 35 lines 34-45, where the updating portion reading a compensation coefficient generates a error signal which is the difference between a transmit signal before and after the distortion processing); a DA and a combiner (112 FIG.8) for converting the error signal to analog signal and adding to an analog transmit signal; a distortion compensation coefficient calculation unit (420&418 FIG.8) for calculating a distortion compensation coefficient (column 35 lines 1-27 where the 420 does the calculation/computation; column 35 lines 36-45 where the 418 does the calculation as well) based upon a transmit signal before the distortion compensation (BASBAND I/Q SIGNAL 102 FIG.8); a distortion compensation coefficient updating unit for updating a coefficient stored in the memory by the corrected/calculated one (420 FIG.8, column 35 lines 44-46, wherein the 420 updates the memory 404 with the corrected/new coefficient); a table for storing in advance in association with combinations of square of the input signal and compensation coefficient, corrected coefficients (column 33 lines 38-50, where the compensation coefficients and calculated amplitude/the calculated power will be provided as a reference table, the memory is a table as well for storing); a distortion compensation coefficient updating unit for updating a coefficient stored in the memory by the corrected one (420 FIG.8, column 35 lines 44-46,

wherein the 420 updates the memory 404 with the corrected/new coefficient). However Barber teaches a comparator for comparing power of a transmit signal and an upper-limit power (FIG.7, column 7 lines 45-65). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the comparator for comparing power taught by Barber in Matsuoka et al.'s system (where setting the upper-limit to the square of the maximum of the signal or the square of the maximum of the coefficient results the same effect) to have the power amplifying circuitry support the wireless telephone systems such as CDMA, TDMA (column 1 lines 15-23, lines 47-55) and compensate the signal losses (column 1 lines 55-column 2 line 20).

Regarding **claim 31**, Matsuoka et al. discloses a distortion compensating apparatus comprising: a memory for storing compensation coefficients; an error signal generator (420 FIG.8, column 35 lines 34-45, where the updating portion reading a compensation coefficient generates a error signal which is the difference between a transmit signal before and after the distortion processing); a predistortion unit for subjecting a transmit signal to distortion compensation processing (110 FIG.8 is the predistortion unit); a distortion compensation coefficient calculation unit (420&418 FIG.8) for calculating a distortion compensation coefficient (column 35 lines 1-27 where the 420 does the calculation/computation; column 35 lines 36-45 where the 418 does the calculation as well), however does not specify an amplitude controller for controlling amplitude of the feedback signal. Barber teaches an amplitude controller for controlling amplitude of the feedback signal (242 FIG.10 is the amplitude controller for controlling amplitude of the feedback signal from the power amplifier 228 FIG.10, column 10 lines 30-32). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the amplitude controller taught by Barber in Matsuoka et al.'s

system to control the feedback signal from the power amplifier to compensate the signal losses (column 1 lines 55-column 2 line 20).

Regarding **claim 38**, Matsuoka et al. discloses a memory for storing distortion compensation coefficients (404/418 FIG.8); an error signal generator (418-420 FIG.8, column 35 lines 34-55, where the updating portion reading a compensation coefficient generates a error signal); a DA and a combiner (112 FIG.8) for converting the error signal to analog signal and adding to an analog transmit signal.

6. Claims 2 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuoka et al. (US 6400774 B1) in view of Mandyam (US 6167273) as applied to claims 1 and 18 above, and further in view of Wismer (US 6212378 B1).

Regarding **claim 2**, further Wismer teaches the frequency multiplexer (FWD. CONTROL SIG. FREQ. MPX Fig.4) for multiplexing digital transmit signals to a frequency shift decided by carrier frequency spacing (426a-426n, column 4 lines 57-60, column 12 lines 36-45, where each 426 has its frequency) before the power amplifier (430 Fig.4). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the frequency multiplexer taught by Wismer in Matsuoka et al.'s system to get the frequency-multiplexed transmit signal as the input signal of the RF amplifier to have the Matsuoka et al.'s system to compensate the distortion of the RF amplifier used in the mobile cellular communication system as CDMA, GSM, etc.

Regarding **claims 19 & 20**, further Wismer teaches the first frequency multiplexer/frequency shifting means (FWD. CONTROL SIG. FREQ. MPX Fig.4) for multiplexing

digital transmit signals to a frequency shift decided by carrier frequency spacing (426a-426n, column 4 lines 57-60, column 12 lines 36-45, where each 426 has its frequency) and a second frequency multiplexer converting the frequency shifted signals to analog signals and combining the analog signals (where the FWD. CONTROL SIG. FREQ. MPX Fig.4 multiplexing and converting the input digital signals form the 420 PROCESSOR to the analog signal to the power amplifier 430 Fig.4), and means for inputting the analog frequency-multiplexed signal before the power amplifier (430 Fig.4). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the frequency multiplexer taught by Wismer in Matsuoka et al.'s system to get the frequency-multiplexed transmit signal as the input transmit signal to the system where it needs the input transmit signal (which includes the error signal generator) to have the Matsuoka et al.'s system to compensate the distortion of the RF amplifier used in the mobile cellular communication system as CDMA, GSM, etc.

7. Claims 15, 17, 26-27, 29-30, and 39-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuoka et al. (US 6400774 B1) in view of Barber (US 6230031 B1) as applied to claims 14, 16, 25, 28 and 31 above, and further in view of Wismer (US 6212378 B1).

Regarding **claims 15, 17, 29 & 39**, further Wismer teaches the frequency multiplexer (FWD. CONTROL SIG. FREQ. MPX Fig.4) for multiplexing digital transmit signals to a frequency shift decided by carrier frequency spacing (426a-426n, column 4 lines 57-60, column 12 lines 36-45, where each 426 has its frequency) before the power amplifier (430 Fig.4). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the frequency multiplexer taught by Wismer in Matsuoka et al.'s system to get the frequency-

multiplexed transmit signal as the input signal of the RF amplifier to have the Matsuoka et al.'s system to compensate the distortion of the RF amplifier used in the mobile cellular communication system as CDMA, GSM, etc.

Regarding **claims 26-27**, **30**, & **40** further Wismer teaches the first frequency multiplexer/frequency shifting means (FWD. CONTROL SIG. FREQ. MPX Fig.4) for multiplexing digital transmit signals to a frequency shift decided by carrier frequency spacing (426a-426n, column 4 lines 57-60, column 12 lines 36-45, where each 426 has its frequency) and a second frequency multiplexer converting the frequency shifted signals to analog signals and combining the analog signals (where the FWD. CONTROL SIG. FREQ. MPX Fig.4 multiplexing and converting the input digital signals form the 420 PROCESSOR to the analog signal to the power amplifier 430 Fig.4), and means for inputting the analog frequency-multiplexed signal before the power amplifier (430 Fig.4). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the frequency multiplexer taught by Wismer in Matsuoka et al.'s system to get the frequency-multiplexed transmit signal as the input transmit signal to the system where it needs the input transmit signal (which includes the error signal generator) to have the Matsuoka et al.'s system to compensate the distortion of the RF amplifier used in the mobile cellular communication system as CDMA, GSM, etc.

Allowable Subject Matter

8. Claims 3-13, 21-24 and 32-37 would be allowable if rewritten to overcome the objection(s) in paragraph 2 set forth in this Office action.

9. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not teach or suggest, alone or in a combination, among other things, at least a distortion compensating apparatus for compensating for distortion of a transmission power amplifier and its method as a whole, the combination of elements and features as claimed, which includes a comparator for comparing power of the transmit signal output from the predistortion unit and an upper-limit power before the calculated distortion compensation coefficient is stored in the memory ; and a distortion compensation coefficient updating unit updating the corrected distortion compensation coefficient when the transmit signal is greater than the upper-limit power; updating the calculated distortion compensation coefficient when the transmit signal is less than the upper-limit power; and a limit-surpass detector detecting the transmit signal from the output of the predistortion unit having surpassed a limit level, and an amplitude controller controlling the amplitude of the feedback signal when the limit level has been surpassed.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edith M Chang whose telephone number is 571-272-3041. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayanti Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Young Tse
YOUNG T. TSE
PRIMARY EXAMINER

Edith Chang
November 7, 2004